
UNITED STATES ARMY
CHEMICAL CORPS

USACHPPM

Readiness thru Health

Chemical Hazards : Expanded Army Responsibilities

BG Lester Martinez-Lopez
USACHPPM

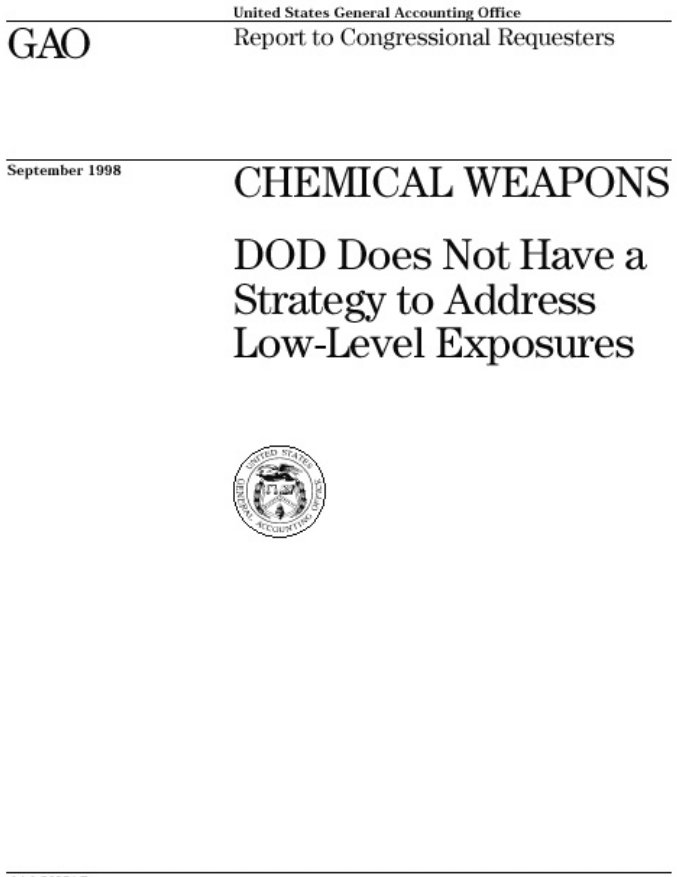
July 2001 WWCC

"***Investing in the Future***"

The Universe of Chemical Hazards

Chemicals	Number
FM 3-9 CWA	34
ITF 25- TICs	98
EPA/OSHA/DOT	2100
HPV	4000
Commerce	75,000
Total (approx)	5,000,000

Low Level CWA –
Operational Significance *versus* Force Health Protection?



United States General Accounting Office
GAO
Report to Congressional Requesters

September 1998

CHEMICAL WEAPONS

DOD Does Not Have a Strategy to Address Low-Level Exposures

GAO/NSIAD-98-228

- "[DoD must] identify and minimize or eliminate the short and long-term health effects of military service, especially during deployments (including war) on the physical and mental health of veterans" *Presidential Review Directive 5 (PRD5), Aug 98*
  - *How low is low level?*
  - *Are any health effects acceptable?*
  - *The level of concern impacts research, detection requirements, and surveillance and follow-up of potentially exposed personnel*

NRC (National Research Council) and Institute of Medicine (IOM) positions regarding protection of military forces:

- "***DoD should develop and clearly express an underlying philosophy for {hazard} protection, including justification and optimization****…* *This should include appropriate follow-up of exposed and potentially exposed individuals…*" and
- "*When making decisions*, ***commanders should attempt to quantify long-term health effects that any action may have on their troops***." IOM, 1999
- "***DoD should designate clear responsibility and accountability for a health risk assessment process encompassing non-battle-related risks and risks from chemical and biological warfare agents… [including] consideration of toxic industrial chemicals and long-term effects from low-level exposures****…."* IOM, 2000

Threat from Toxic Industrial Chemicals- Also a growing consensus:

- ***ITF-25***: *"..**there is a hazard from the release of industrial chemicals in a military situation**. Toxic industrial chemicals are legitimate articles of commerce, are widely produced and traded and are available worldwide. It is highly likely that CANUKUS forces will encounter toxic industrial chemicals in their military missions throughout the world."*
- ***JP 3-11***: *"The most important action in case of massive industrial chemical release is immediate evacuation outside the hazard's path. The greatest risk from a large-scale toxic chemical release occurs when personnel are unable to escape the immediate area and are overcome by vapors or blast effects.* ***Military respirators and protective clothing may provide only limited protection against TIC****."*
- ***DI-1816-8-99***: *"**Personnel deployed in support of missions ranging from war to operations other than war may be exposed to harmful chemicals as a result of industrial accidents, sabotage, or the intentional or unintentional actions** of enemy or friendly forces."*

A Broad Spectrum of Operations and Competing Risks: Who is responsible?

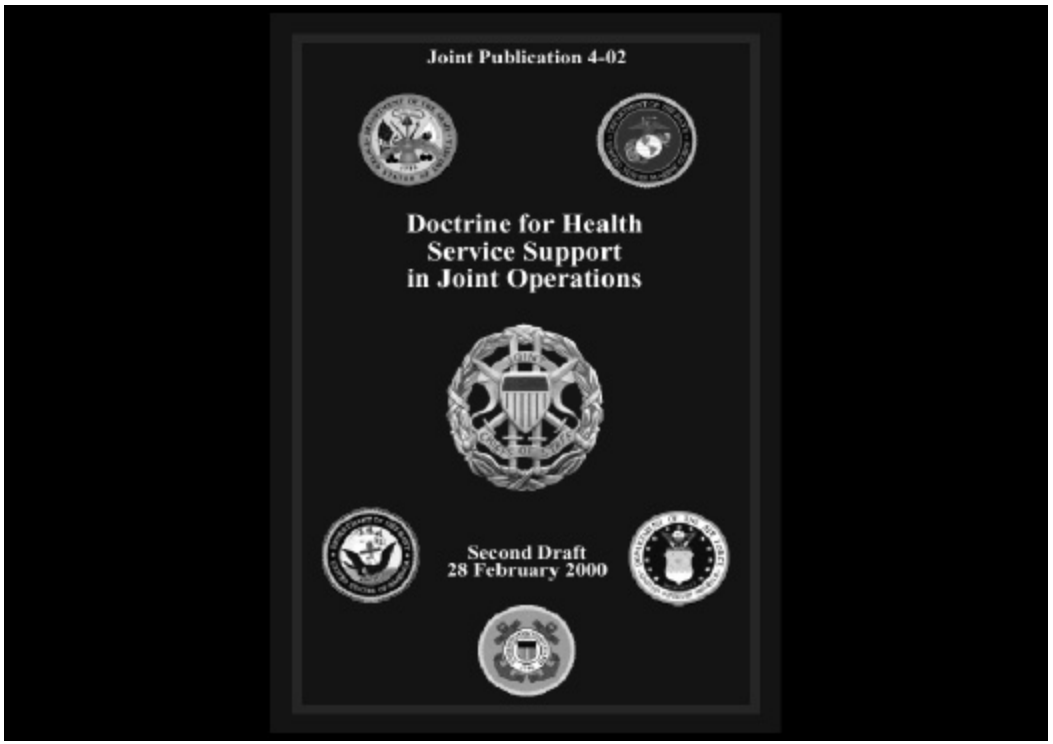
Catastrophic TIC Releases

CWA Attack ? **Ambient Pollutants/TICS**

CWA Residual/Low Level

Deployment Occupational and Environmental Health

DOD Policy/Doctrine



DOD Policy

- DOD-I 6490.3 Implementation and Application of Joint Medical Surveillance for Deployments, Aug 97
- DOD-I 6055.1, Safety and Occupational Health Program, Aug 98
- JCS Memorandum MCM-251-98, 04 DEC 98, "Deployment Health Surveillance and Readiness." (Under Revision)
- JCS Force Health Protection Capstone Document, Jan 00

Joint Doctrine

- Joint Publication (JP) 4.04 - Joint Doctrine for Civil Engineering Support (under revision)
- JP 4.02 - Joint Doctrine for Health Service Support in Joint Operations (under revision)
- JP 3.11 - Joint Doctrine for Operations in Nuclear, Biological, and Chemical (NBC) Environments, 11 Jul 00

• **Common Theme: "identify and assess potential hazards, and evaluate and document actual exposures….."**

Deployment Occupational and Environmental Health
Pertinent Army Policy/Doctrine

FM 100-5: "Leaders have a special responsibility to subordinates. They must never risk their soldiers' lives needlessly."

"**In those instances where mission accomplishment and military necessity results in the requirement to make risk decisions to override peacetime standards, such decisions must be made at the appropriate level of command and based on full consideration of the safety, occupational health and environmental impacts**" HQDA, June 01

Army Policy

- AR 40-5, Preventive Medicine (under revision)
- HQDA Policy –FHP- Deployment OEH Threats, June 01
- Draft – Joint Service Instruction for Deployment Health Surveillance and Protection, Fall 99

Army Doctrine

- FM 100-5, OPERATIONS, Jun 93
- FM 100-14, Risk Management, Apr 98
- FM 8-10, Combat Health Support, Mar 91
- FM 4-02.17, Preventive Medicine Services, Aug 00
- FM 21-10/MCRP 4-11.1D, FIELD HYGIENE AND SANITATION, Jun 00
- FM 3-100.4, Environmental Considerations in Military Operations, Jun 00
- FM 3-11.4-1, Multi-service Procedures for NBC Defense Of Theater Fixed Sites, Ports, and Airfields, FCD Apr 00
- STP 21-1-SMCT SOLDIER'S MANUAL OF COMMON TASKS SKILL LEVEL 1, 01 OCT 1994 (under revision)

Specific Army Policy:

HQDA Ltr 1-01-1, DASA-ESOH; Force Health Protection (FHP): Occupational and Environmental Health Threats; 27 June 2001

OBJECTIVES:

- Use the Operational Risk Management Process to manage FHP-OEH threats and minimize total risk to personnel

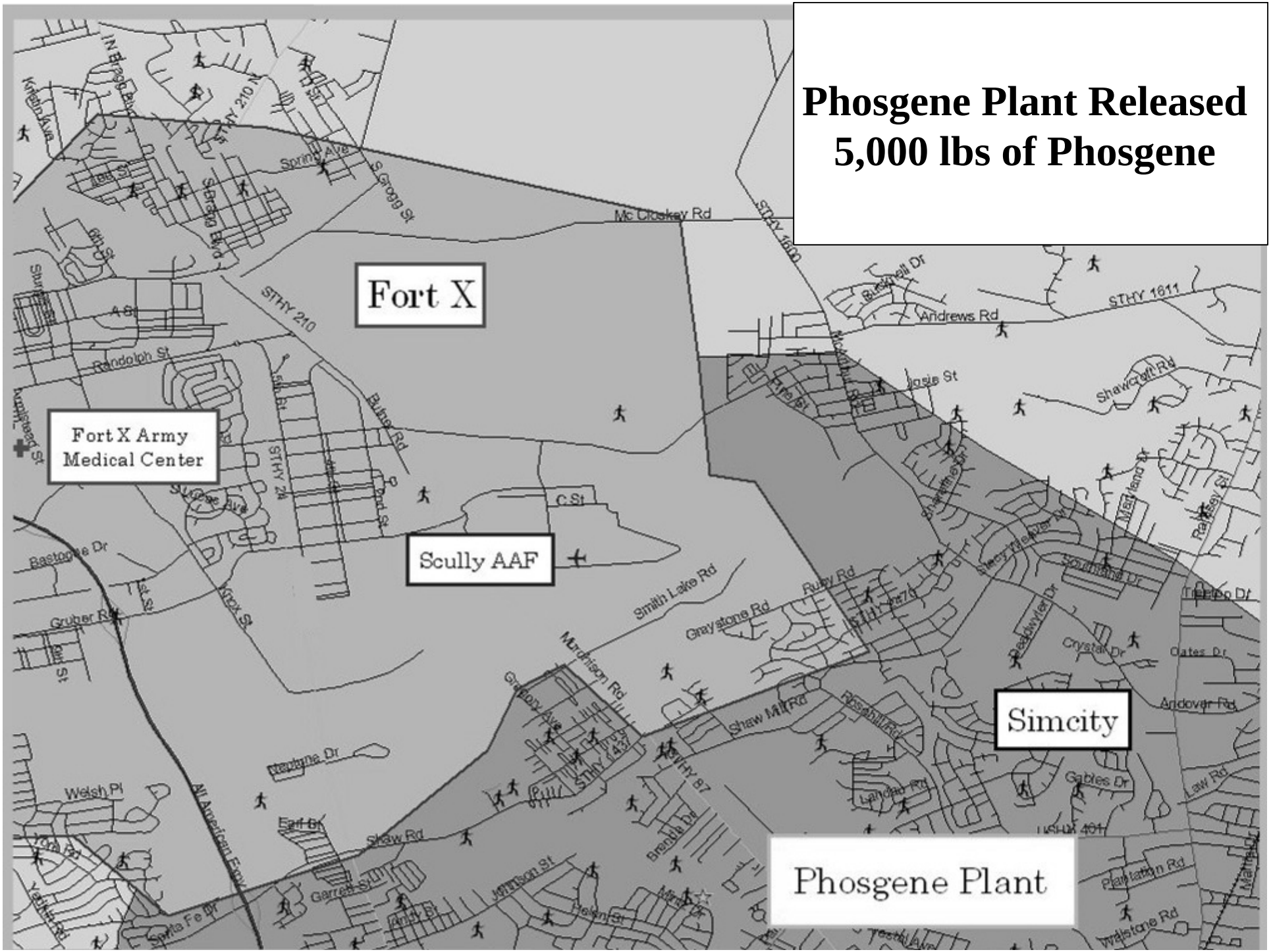
- Ensure that commanders are aware of and consider the FHP-OEH risks created by OEH exposures (both short-term and long term) during all phases of military operations and over the broad spectrum of military operations.

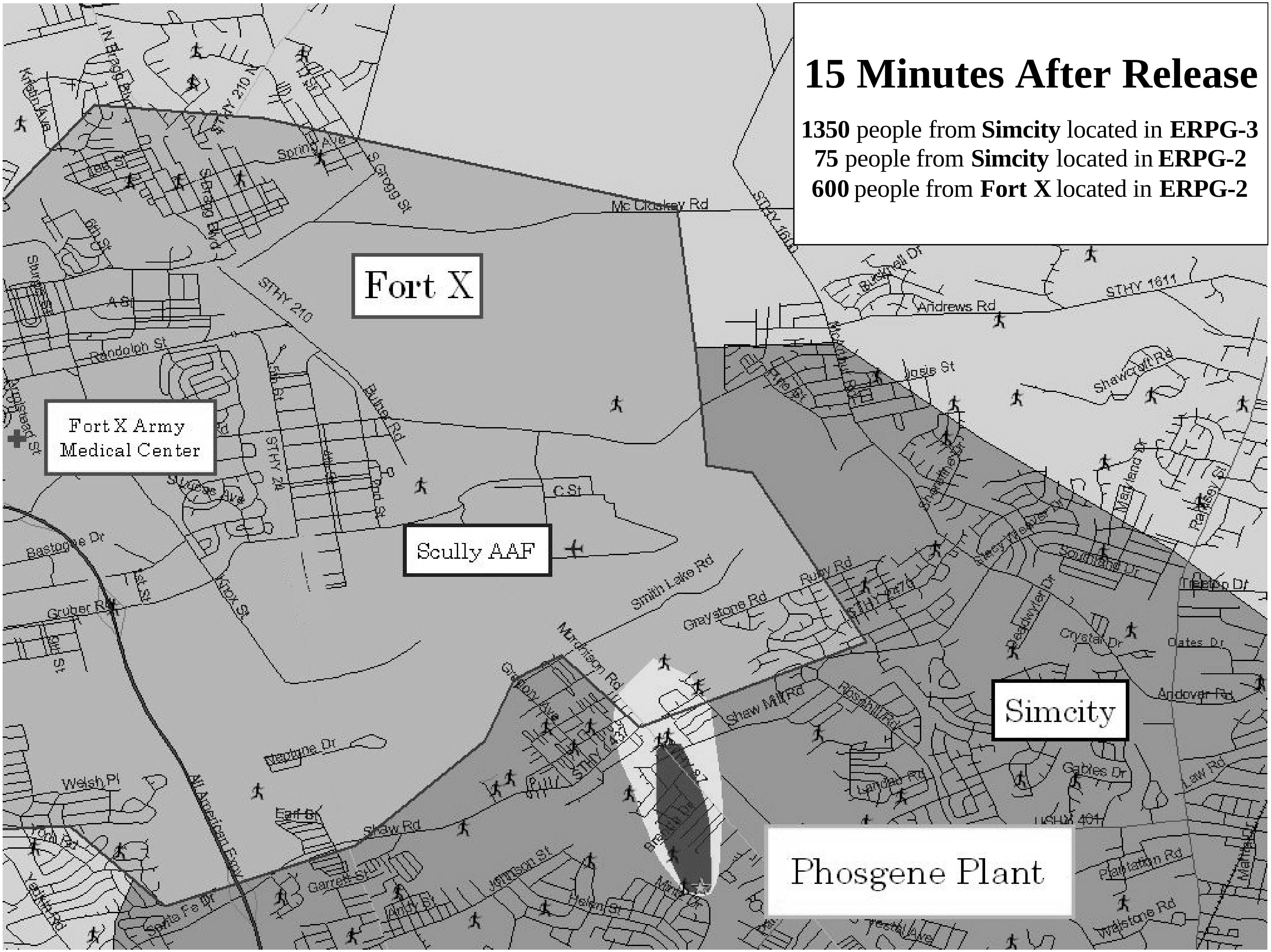
- Reduce OEH exposures to as low as practicable to minimize short-term and long-term health effects in personnel, within the context of the full spectrum of health and safety risks confronting personnel and consistent with ORM principles…….

➢ **www.usapa.army.mil**

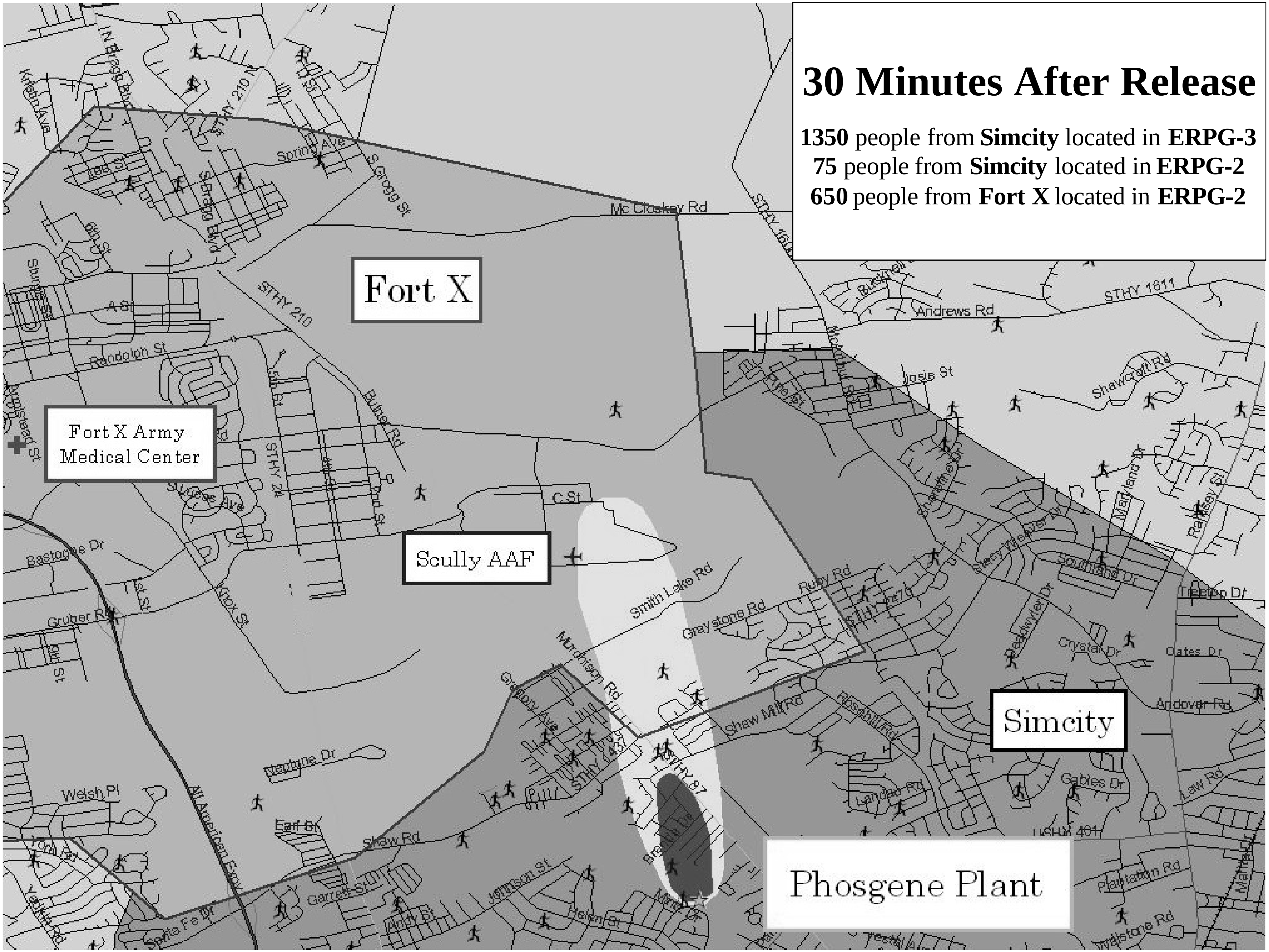
Operational Risk Assessment Matrix
(FM 100-14 and FM 3-100.12)

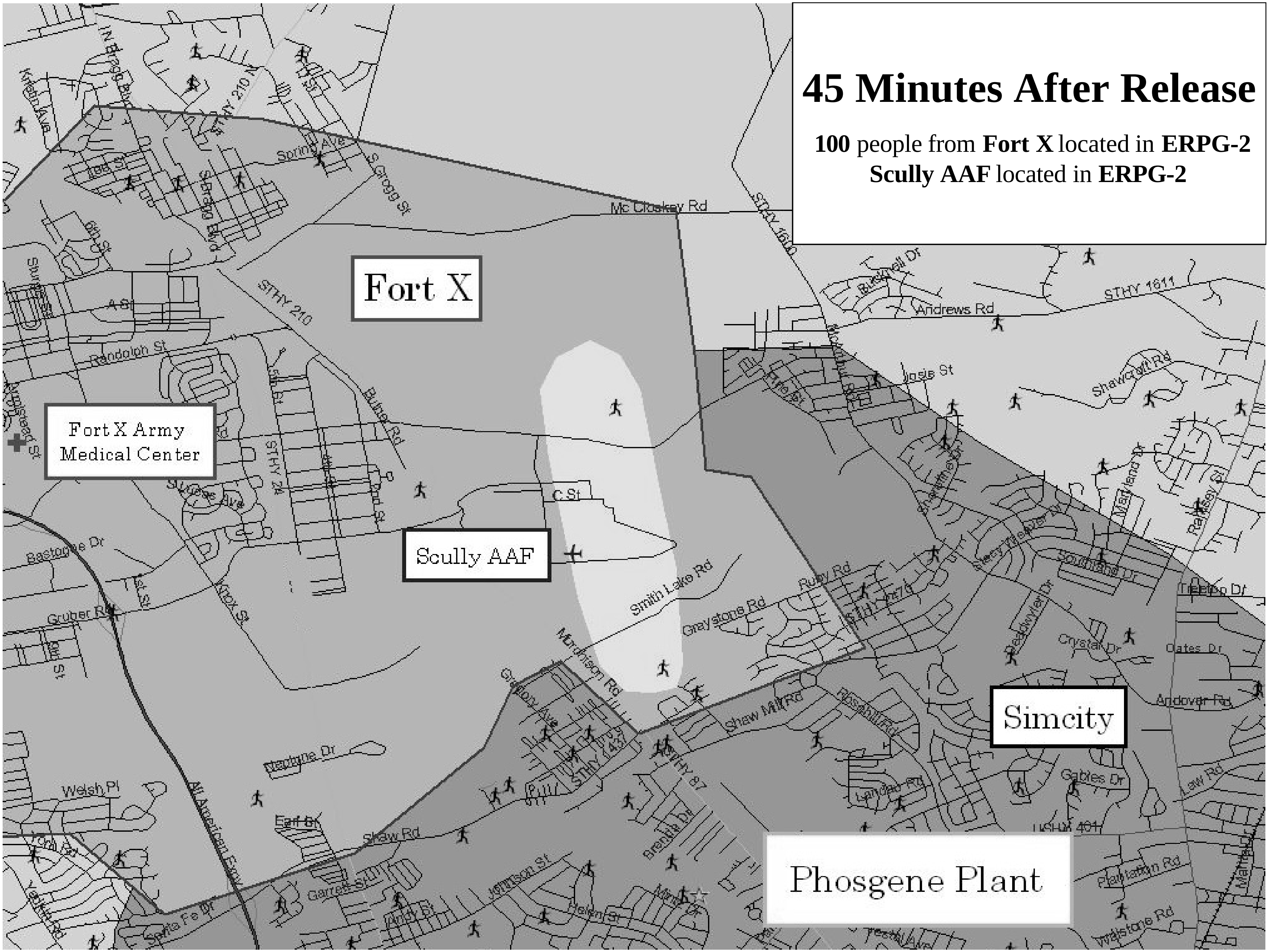
HAZARD SEVERITY	HAZARD PROBABILITY				
	Frequent (A)	Likely (B)	Occasional (C)	Seldom (D)	Unlikely (E)
Catastrophic (I)	Extremely High	Extremely High	High	High	Moderate
Critical (II)	Extremely High	High	High	Moderate	Low
Marginal (III)	High	Moderate	Moderate	Low	Low
Negligible (IV)	Moderate	Low	Low	Low	Low
	RISK ESTIMATE				


Phosgene Plant Released
5,000 lbs of Phosgene
Fort X
Fort X Army
Medical Center
Scully AAF
Simcity
Phosgene Plant
Mc Closkey Rd
Andrews Rd
Randolph St
Smith Lake Rd
Graystone Rd
Shaw Mill Rd
Shaw Rd
Gruber Rd
Bastogne Dr
Welsh Pl
Yorktown Rd
Sante Fe Dr
Garrett St
Jamison St
Plantation Rd
Walstone Rd
Gates Dr
Andover Rd
Law Rd
Crystal Dr
Gables Dr
Burma Rd
Knox St
Spring Ave
S Gregg St
Shawcroft Rd
Josie St
Ruby Rd
Murchison Rd
Gregory Ave
Brentle Dr
Landau Rd
Rosehill Rd
Reddwyler Dr
Trenton Dr
Southland Dr
Maryland St
Ramsey St
Sherborne Dr
Buskirk Dr
Fire St
STHY 210
STHY 1611
STHY 1600
STHY 24
STHY 87
STHY 1670
STHY 1643
USHWY 401
All American Expy
6th St
4 St
A St
C St
Post St
Hospital St

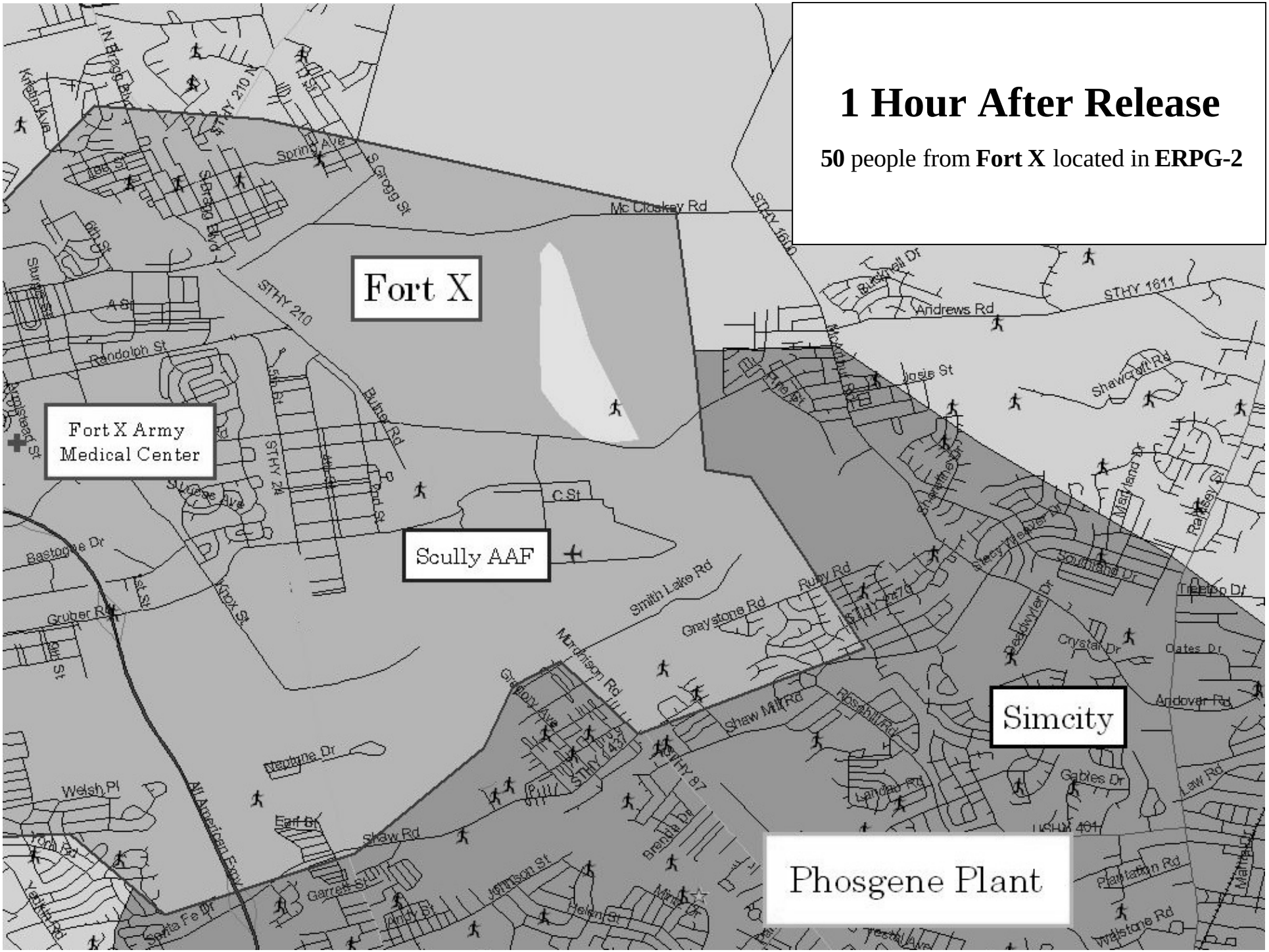


15 Minutes After Release
1350 people from Simcity located in ERPG-3
75 people from Simcity located in ERPG-2
600 people from Fort X located in ERPG-2
Fort X
Fort X Army Medical Center
Scully AAF
Simcity
Phosgene Plant


30 Minutes After Release
1350 people from Simcity located in ERPG-3
75 people from Simcity located in ERPG-2
650 people from Fort X located in ERPG-2
Fort X
Fort X Army Medical Center
Scully AAF
Simcity
Phosgene Plant



45 Minutes After Release
100 people from Fort X located in ERPG-2
Scully AAF located in ERPG-2
Fort X
Fort X Army Medical Center
Scully AAF
Simcity
Phosgene Plant
Mc Closkey Rd
Andrews Rd
STHY 1611
Smith Lake Rd
Graystone Rd
Shaw Mill Rd
Shaw Rd
Randolph St
Bastogne Dr
Gruber Rd
Welsh Pl
Knox St
STHY 210
STHY 24
STHY 87
C St
Gables Dr
Crystal Dr
Andover Rd
Oates Dr
Law Rd
Plantation Rd
Walstone Rd


1 Hour After Release
50 people from Fort X located in ERPG-2
Fort X
Fort X Army Medical Center
Scully AAF
Simcity
Phosgene Plant
Mc Closkey Rd
STHY 1650
STHY 1611
Andrews Rd
STHY 210
Randolph St
Bulge Rd
C St
Smith Lake Rd
Graystone Rd
Ruby Rd
Shaw Mill Rd
Morphison Rd
Shaw Rd
Josie St
Bastogne Dr
Gruber Rd
Knox St
Newbyne Dr
Welsh Pl
All American Expy
Garrett St
Johnson St
Helen St
Sparta Fe Dr
Crystal Dr
Oates Dr
Andover Rd
Gables Dr
Law Rd
Plantation Rd
Wolstone Rd
Meadowview Dr
Southland Dr
Treetop Dr
Parkway Dr
Maryland Dr
Shawcroft Rd
Brentwood Dr
Spring Ave
S Grogg St
N Bragg Blvd
Knight Ave
6th St
Shurling Dr
4 St
1st St
2nd St
3rd St
5th St
Pine St
Post St
Amphitheater Rd
Buckwell Dr
Rifle Dr
Sharpshooter Dr
Mercy Thicket Dr
Redcloud Dr
Westland Dr
Parkway Dr
Treetop Dr
Crystal Dr
Oates Dr
Andover Rd
Gables Dr
Law Rd
Plantation Rd
Wolstone Rd
Meadow Dr
Laurel Dr
Brentwood Dr
Shaw Rd
Garrett St
Johnson St
Helen St
Sparta Fe Dr
Yarmouth Rd
Welsh Pl
Newbyne Dr
All American Expy
Gruber Rd
Bastogne Dr
Knox St
Graystone Rd
Smith Lake Rd
Ruby Rd
Shaw Mill Rd
Morphison Rd
Gregory Ave
Josie St
Andrews Rd
Mc Closkey Rd
STHY 1650
STHY 1611
STHY 210
STHY 24
STHY 87
STHY 1437
STHY 1611
USHWY 401
Randolph St
Bulge Rd
C St
Post St
Pine St
Amphitheater Rd
Spring Ave
S Grogg St
N Bragg Blvd
Knight Ave
6th St
Shurling Dr
4 St
1st St
2nd St
3rd St
5th St
Buckwell Dr
Rifle Dr
Sharpshooter Dr
Mercy Thicket Dr
Redcloud Dr
Westland Dr
Parkway Dr
Treetop Dr
Southland Dr
Shawcroft Rd
Brentwood Dr
Laurel Dr
Meadow Dr
Wolstone Rd
Plantation Rd
Law Rd
Gables Dr
Andover Rd
Oates Dr
Crystal Dr
Meadowview Dr
Gregory Ave
Morphison Rd
Shaw Mill Rd
Graystone Rd
Ruby Rd
Smith Lake Rd
Knox St
Gruber Rd
Bastogne Dr
Newbyne Dr
Welsh Pl
All American Expy
Garrett St
Johnson St
Helen St
Sparta Fe Dr
Yarmouth Rd
Shaw Rd
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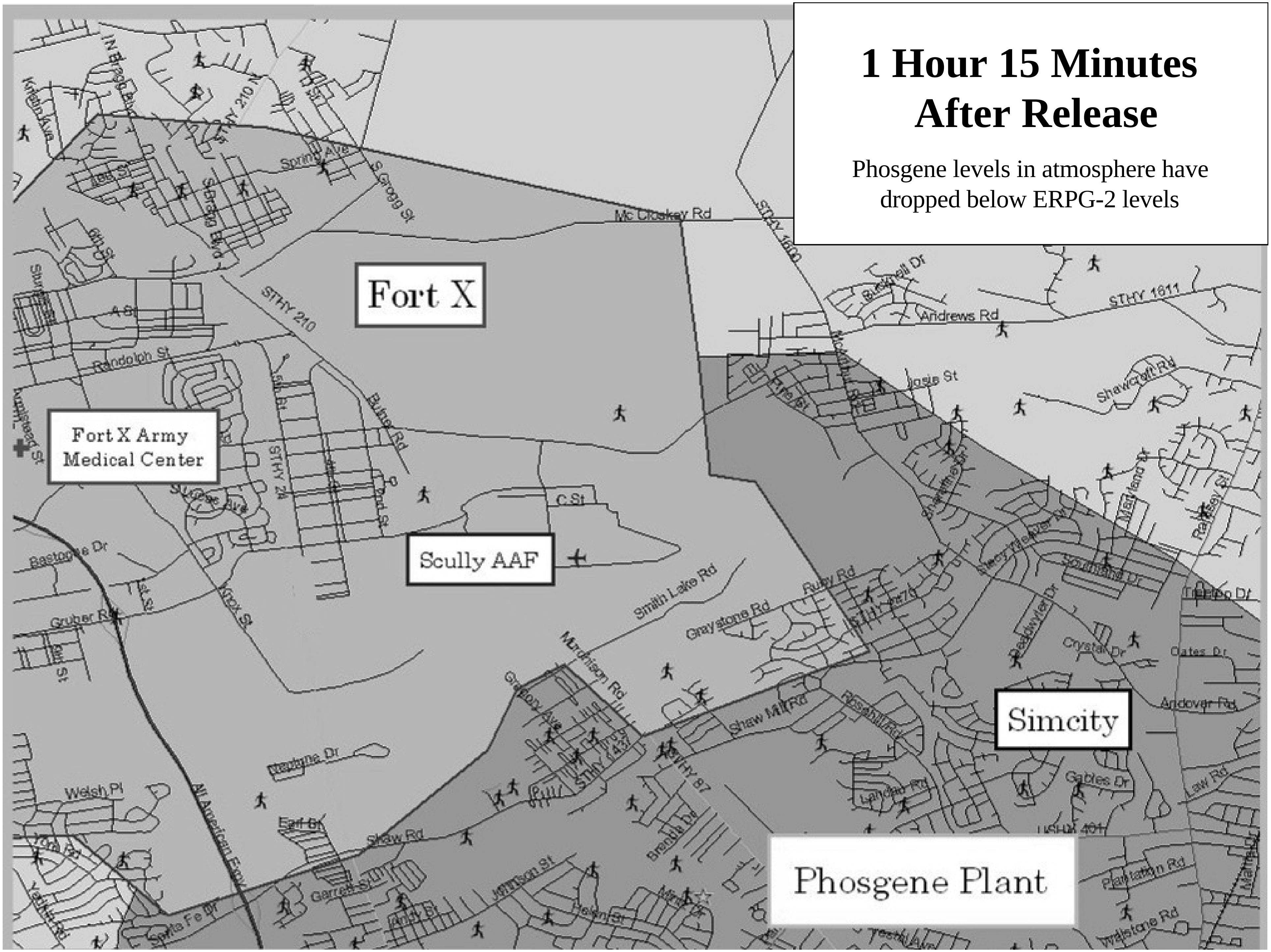
Laurel Dr
Meadow Dr
Wolstone Rd
Plantation Rd
Law Rd
Gables Dr
Andover Rd
Oates Dr
Crystal Dr
Meadowview Dr
Treetop Dr
Southland Dr
Parkway Dr
Maryland Dr
Shawcroft Rd
Josie St
Andrews Rd
Buckwell Dr
Rifle Dr
Sharpshooter Dr
Mercy Thicket Dr
Redcloud Dr
Westland Dr
Amphitheater Rd
Spring Ave
S Grogg St
N Bragg Blvd
Knight Ave
6th St
Shurling Dr
4 St
1st St
2nd St
3rd St
5th St
Pine St
Post St
Bulge Rd
C St
Randolph St
STHY 210
STHY 24
STHY 87
STHY 1437
STHY 1611
USHWY 401
Mc Closkey Rd
STHY 1650

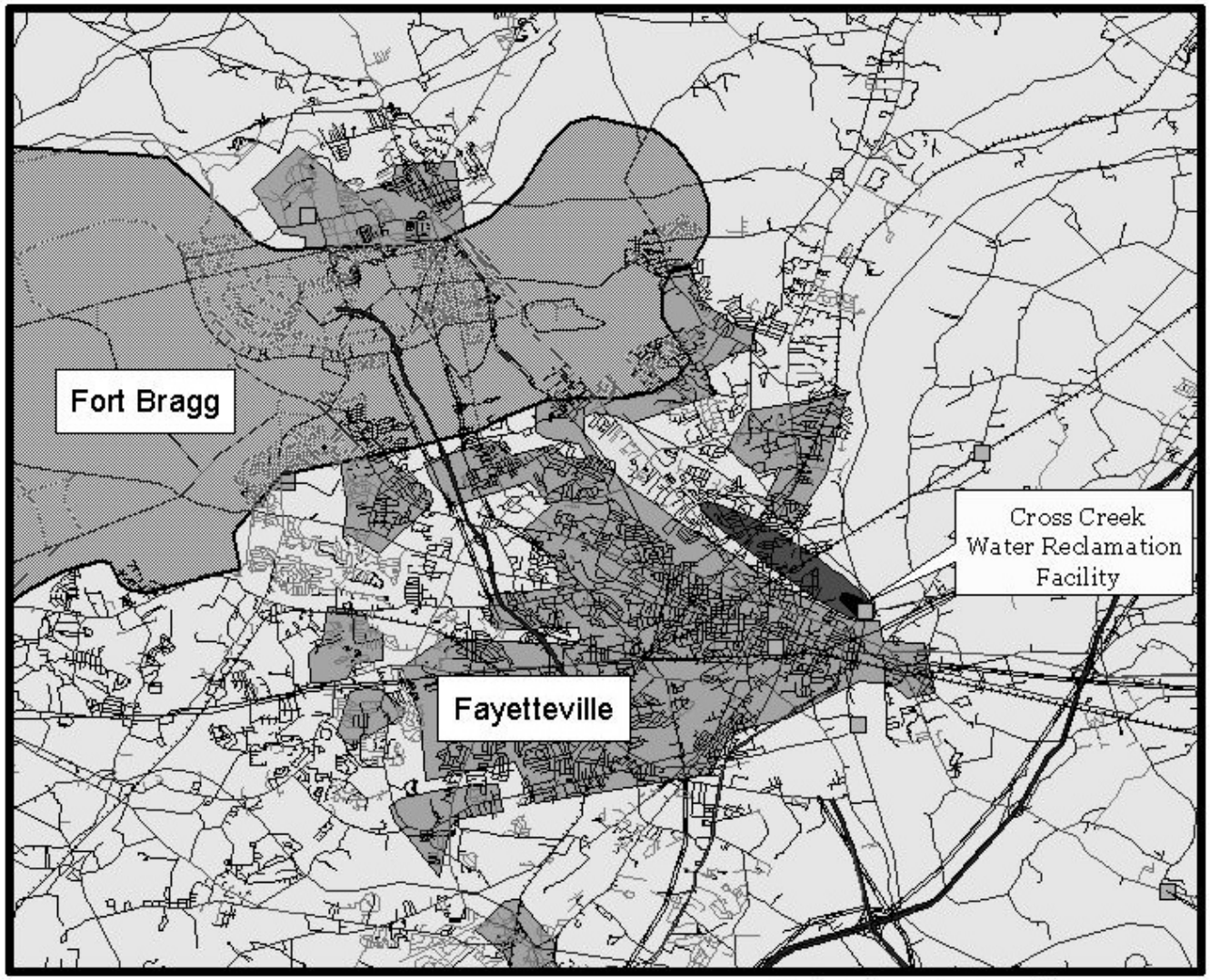
1 Hour 15 Minutes After Release

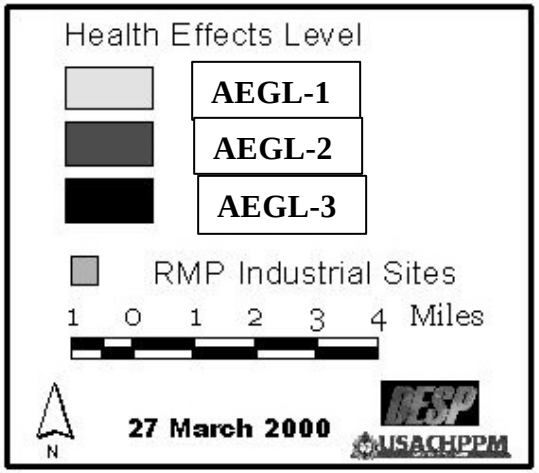
Phosgene levels in atmosphere have dropped below ERPG-2 levels

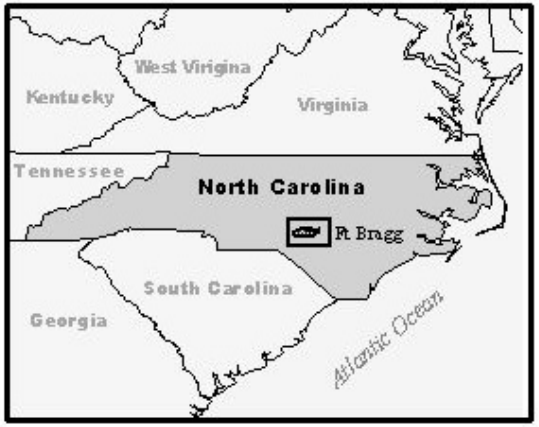


Hypothetical Chemical Incident Near Fort Bragg:

(Chlorine) Gas Plume and Associated Health Impact Zones



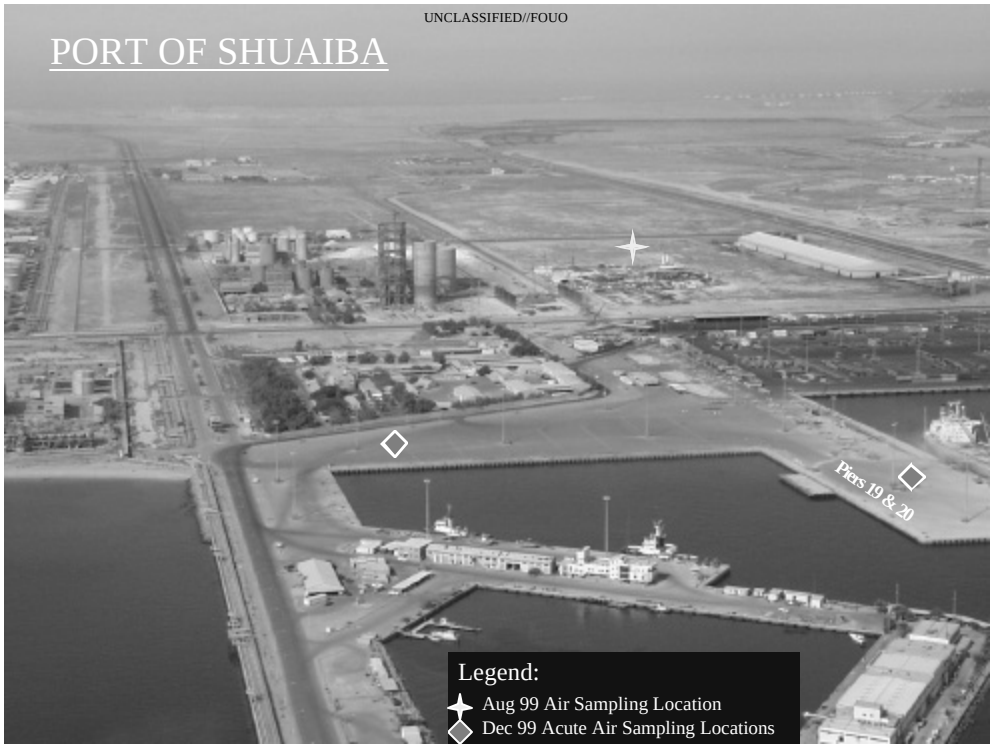




Projection: Geographic

Industrial Information provided by EPA Risk Management Plans, (RMP) Hypothetical Release modeled by USACHPPM using CATS and HPAC software, Release plume is time, date and concentration specific

CENTCOM Environmental Health Surveillance Native Atlas 00



Shuaiba Port, Kuwait

- Site Sampled during ODT98
  - Alternative site for troop housing
  - Establish Environmental sampling program for site

Conclusions (August 1999, December 1999):

- CO and SO_2 levels may result in detrimental health effects to exposed US Forces.
- These results indicate that potential operational risks are High, consistent w/FM 100-14.
- Site environmental conditions are variable due to seasonal changes and industrial activity
- Minimize exposure of US Forces to Shuaiba Port site contaminants by:
  - Relocating overall operation to a less contaminated area.
  - Relocating military billeting area to an alternate site.
  - Reducing on-site duty time to the minimum required for mission accomplishment.
- Design and implement an environmental and occupational health surveillance program prior to, and during planned operation.
- Design and implement a disease and injury surveillance program during the planned operation to monitor and counter any site-induced health outcomes.

CENTCOM Environmental Health Surveillance

Shuaiba Port Environmental Health Surveillance Sampling Summary

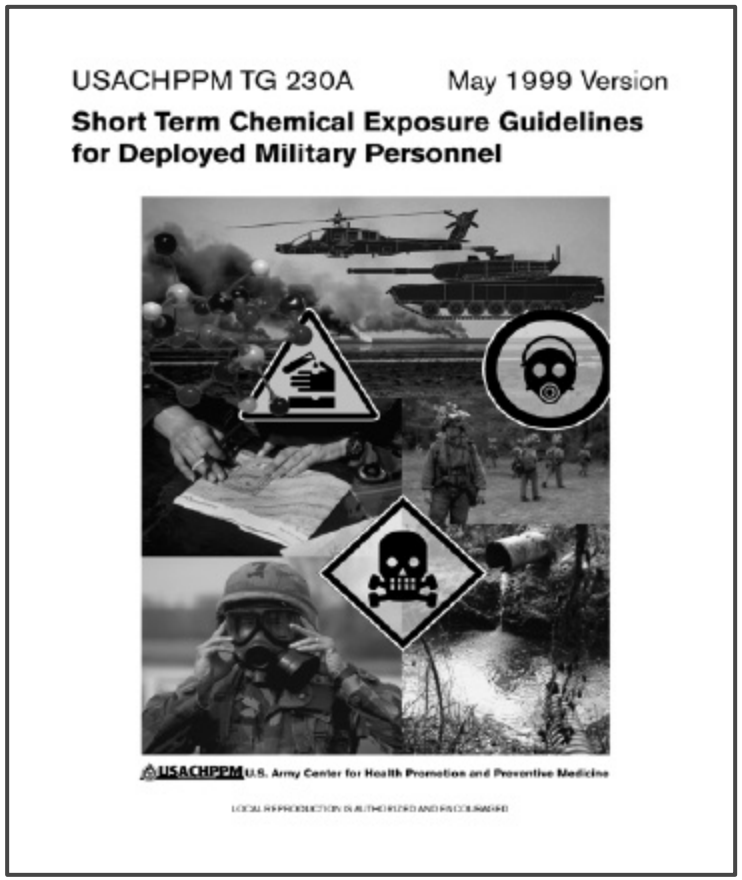
Parameter	# Samples	Maximum Concentration (ppm)	Guideline (ppm)
Air – CO	1-week*	260 (1-hour)	200 (1-hour)
Air - SO_2	1-week*	8.74 (1-hour)	3 (1-hour)
Air - PM_{10}	24	134.5 (24-hour)	150 (24-hour)
Air – VOCs	33	Varies	Within guidelines+
Soil	7	Varies	Within guidelines+

*Continuous sampling logged every minute

+All sample parameters were within applicable guidelines.

Deployment Occupational and Environmental Health (OEH)

USACHPPM Risk Assessment and Risk Management Guidance



- TG 248 – Guide for Deployed Military Personnel on Health Hazard Risk Management, Final 3Q01
- TG 230A -Short Term Chemical Exposure Guidelines (1 hour-2 weeks) – Final May 99
- TG 230B- Long Term Chemical Exposure Guidelines (1 year) - Draft Jun 00/Final 4Q01
- TG-238: Radiological Sources of Potential Exposure and/or Contamination, Final Jun 99
- TG-236A: Basic Radiological Dose Estimation- A Field Guide, Final 2Q01
- TG-239: Radiological Health Risk Assessment, Draft Jan 01/Final Jun 01.
- TG-236B (RD-236B): Advanced Radiological Dose Estimation Draft 4QFY01/Final FY02.
- TG 251: Deployment Environmental Surveillance Sampling Guide, Draft Sep 00/Final 3Q01

Significant work lies ahead – We must work together

- ***HQDA Ltr 1-01-1:*** *"… (TRADOC) will… Through close coordination with the U.S. Army Chemical School and in close cooperation with the USAMEDCOM, develop and implement doctrinal, training, organization, and material solutions to the risks presented by chemical/biological agents, toxic industrial hazards, and radiation…."*

CHALLENGES

- **Identifying priorities:**
  - which chemicals vs
  - how much protection/avoidance
- **Balancing New Equipment Needs**:
  - More chemicals and lower detection levels vs
  - Lighter, faster, more accurate specifications

- **Changing historic CWA "go-no go" philosophy to ORM process**
  - Identifying exposures vs
  - Need and ability to protect/avoid given other hazards
- **Coordinating updates of operational and medical/PM doctrine**
  - Operational significance vs
  - FHP/long-term military responsibilities
- **Personnel and Training**
  - Increased requirements and technically complex issues vs
  - Reduced force structure…***All the more to ensure force strength through FHP!***

USACHPPM POCs:

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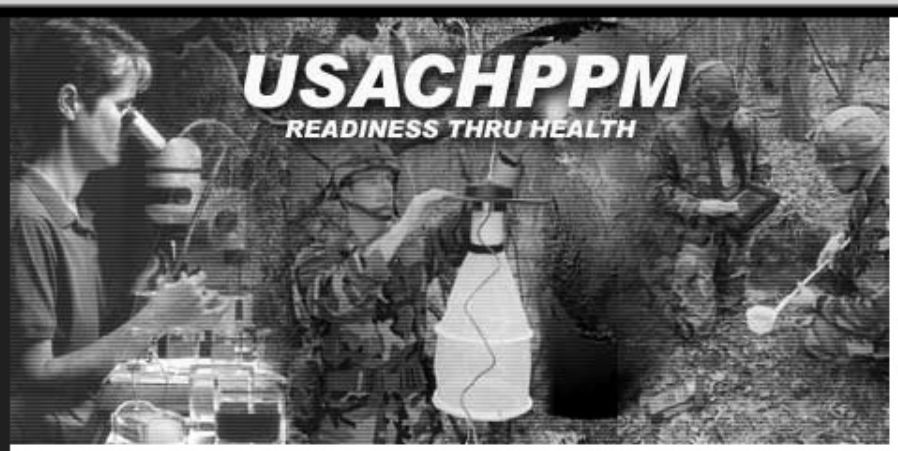

U.S. Army Center for Health Promotion & Preventive Medicine

USACHPPM News

USACHPPM Top Stories

Mad Cow Disease

There has been some news recently about Bovine Spongiform Encephalopathy (BSE) or "Mad Cow Disease" infected beef in Europe. Bovine Spongiform Encephalopathy (BSE) was first diagnosed in Great Britain in 1986.....
More

Foot and Mouth Disease

Europe is currently experiencing an outbreak of Foot and Mouth Disease (FMD). FMD is a disease that affects animals, and people are not at risk. Although it affects cattle, it is not related to Bovine Spongiform Encephalopathy (BSE).
More

Depleted Uranium

Dietary Supplements

Calendar of Events

April 2001

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Mr. Paul Cockman - Conference Organizer

NDIA - Conference Co-Sponsor

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CPT Toops
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1LT Turner
1LT Figueroa
SSG Vijarr
SFC Klaus
SSG Hodge
PVT Osman
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www.dtic.mil/ndia/2001chemical/2001chemical.htm

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